

II. AMENDMENTS TO THE CLAIMS:

*Please amend claims as set forth below.*

1. (Currently Amended) An automated or semi-automated system for optimising the production performance of a milk producing animal herd comprising a plurality of individual herd members each assigned a unique identification code that is recognisable by the system, the system comprising the following interconnected means:

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(a) means for collecting a milk sample from an individual member of said herd, said means for collecting a milk sample being connectable to a herd milking system,

(b) means for recognising the identification code of the individual herd member,

(c) means for storing data including data for a physiological and nutritional state of said each individual herd member

(d) means for analysing a plurality of compounds or parameters in a milk sample being collected, said means for analysing a plurality of compounds or parameters comprising:

i) separate means for analysing individual compounds or parameters in the milk sample, each of said separate means for analysing individual compounds or parameters being capable of generating a detectable signal in the presence of an individual milk compound or parameter,

(ii) means for directing a part of the milk sample to each separate analysing means, said directing means being controlled in response to at least one change for at least one parameter in at least one individual herd member recorded by said means for storing data for the physiological state, a nutritional state or a combination of physiological and nutritional state of each individual herd member relative to the data in said means for storing data for said individual herd member such that the directing means is only activated at pre-selected points in time or at pre-selected time intervals in the reproduction or lactation cycles, or said

directing means being controlled in response to a signal from said means for storing data such that the directing means is only activated at pre-selected points in time or at pre-selected time intervals in the reproduction or lactation cycles,

(iii) means for detecting signals generated in the presence of a compound or parameter being analysed,

(e) means for converting the detected signals to a set of data that is indicative of the physiological condition, the nutritional condition or a combination of the physiological and nutritional conditions of said individual herd member,

(f) means for storage of said set of data descriptive of the physiological condition, the nutritional condition or a combination of the physiological and nutritional conditions for said individual herd members, and

(g) data output means for producing data output.

2. *(Original)* A system according to claim 1 where the sample collecting means is adapted to collect a milk sample from an individual mammary gland of a herd member.

3. *(Original)* A system according to claim 1 where the sample collecting means is adapted to collect a sample combining milk from two or more mammary glands of a herd member.

4. *(Previously Presented)* A system according to claim 2 or 3 where the sample collecting means is capable of collecting a proportional milk sample which is representative of average composition of total milk produced during the milking of each individual herd member.

5. *(Original)* A system according to claim 2 or 3 where the sample collecting means is capable of collecting a subsample during a pre-selected time interval of the milking operation.

6. *(Original)* A system according to claim 1 where the sample collecting means comprises means for storing a milk sample being collected.
7. *(Original)* A system according to claim 6 where the means for storing a milk sample comprises mixing means.
8. *(Previously Presented)* A system according to any of claims 1-3 or 6 where the sample collecting means further comprises or is operationally connected with at least one of (i) means permitting the sample collecting means to be cleaned between samples, (ii) means for storing a buffer solution or a dilute solution, (iii) means for connecting the means for storing a milk sample to the means for analysing a plurality of compounds or parameters, the means for storing a buffer solution or the dilute solution, the herd milking system, a sample discharge outlet or a combination of the milking system and the sample discharge outlet, (iv) means for controlling the temperature of the milk sample being collected and (v) means for transporting the milk sample being collected.
9. *(Original)* A system according to any of claims 1-3 or 6 where the sample collecting means comprises means for storing a plurality of milk samples.
10. *(Original)* A system according to claim 9 where the means for storing a plurality of milk samples is in the form of a device comprising a plurality of milk storage containers.
11. *(Previously Presented)* A system according to claim 10 where the device comprising a plurality of milk storage containers is insertable into the milk collecting means prior to collecting milk samples and is removable therefrom when the plurality of samples is collected for bringing it into operational contact with the analytical means.
12. *(Previously Presented)* A system according to claims 6 or 7 where the means for storing a milk sample has a pressure that is different from the pressure of the herd milking system to which said means is connected.

13. *(Previously Presented)* A system according to any of claims 1-3 or 6 where the means for collecting a milk sample is connected to an element of the herd milking system selected from the group consisting of a teat cup, a teat tube, a milk metering device and a milk transporting tube.

14. *(Previously Presented)* A system according to claim 13 where the means for collecting a milk sample is connected to a tubing element of the herd milking system.

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15. *(Original)* A system according to claim 1 where the separate means for analysing individual compounds or parameters in the milk sample includes means for analysing at least one compound or parameter selected from the group consisting of a compound or parameter that is indicative of mastitis, a compound or parameter that is indicative of the reproduction cycle state of the milking animal and a compound or parameter that is indicative of the energy and nutritional state of the milking animal.

16. *(Original)* A system according to claim 15 comprising separate analysing means for analysing a compound or parameter indicative of mastitis that is selected from the group consisting of somatic cells, microbial cells or parts thereof, an enzyme, a protein, a lipid, a mineral, a trace element, milk temperature, conductivity of the milk and a particle that is separable by filtration.

17. *(Original)* A system according to claim 16 where the compound indicative of mastitis is an enzyme, the amount of which is increased in milk from an inflamed mammary gland.

18. *(Original)* A system according to claim 17 where the enzyme is selected from the group consisting of lactate dehydrogenase (LDH) and beta-N-acetylglucosaminidase (NAGase) E.C. 3.2.1.52.

19. *(Currently Amended)* A system according to claim 18 where the separate analysing means for analysing NAGase is capable of detecting an amount of NAGase which is in

the range of 0 to 0.1 U/ml and/or an amount of LDH which is in the range of 100 to 2000 U/ml [[U/m]], or a combination of an amount of NAGase, which is in the range of 0 to 0.1 U/ml and an amount of LDH which is in the range of 100 to 2000 U/ml.

20. *(Currently Amended)* A system according to claim 15 comprising separate analysing means for analysing a compound or parameter, the presence or amount of which in milk is indicative of the reproduction cycle state of the milking animal, that is selected from the group consisting of a compound that indicates pro-oestrus, a compound that is indicative of oestrus (heat), a compound that indicates di-oestrus and a compound that indicates pregnancy.

21. *(Original)* A system according to claim 20 where the compound indicative of the reproduction cycle state of the milking animal is a hormone.

22. *(Original)* A system according to claim 21 where the hormone to be analysed is progesterone.

23. *(Previously Presented)* A system according to claim 22 where the separate analysing means for analysing progesterone is capable of detecting an amount thereof in the milk sample which is in the range of 0 to 30 ng/ml.

24. *(Original)* A system according to claim 15 comprising separate analysing means for analysing a compound or parameter indicative of the energy and/or nutritional state of the milking animal that is selected from the group consisting of a compound or parameter that is indicative of the protein balance of the milking animal and a compound or parameter that is indicative of the overall energy balance of the milking animal.

25. *(Original)* A system according to claim 24 where the compound or parameter that is indicative of the protein balance of the milking animal is selected from the group consisting of milk urea nitrogen (MUN) and total milk protein.

26. *(Previously Presented)* A system according to claim 25 where the separate analysing means for analysing a compound or parameter that is indicative of the protein balance of the milking animal is capable of detecting an amount of MUN which is in the range of 0 to 1000 mg/l.

27. *(Original)* A system according to claim 24 where the compound or parameter that is indicative of the overall energy balance of the milking animal is selected from the group consisting of a ketone body compound and total milk fat content.

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28. *(Original)* A system according to claim 27 where the ketone body compound is selected from the group consisting of acetolactate, beta-hydroxybutyrate (BOHB) and acetone.

29. *(Original)* A system according to claim 28 where the analysing means for analysing a compound or parameter that is indicative of the overall energy balance of the milking animal is capable of detecting an amount of BOHB which is in the range of 0 to 0.7 mM.

30. *(Previously Presented)* A system according to claim 1 where the separate means for analysing an individual compound or parameter in the milk sample includes means for analysing at least one compound selected from the group consisting of NAGase, progesterone, milk urea nitrogen, total protein content, BOHB, total fat content and milk yield.

31. *(Original)* A system according to any of claims 1-3, 6 or 15 where the means for analysing a plurality of compounds or parameters in a milk sample is analytically linked to a plurality of means for collecting a milk sample.

32. *(Previously Presented)* A system according to claim 31 where milk samples collected by the plurality of means for collecting a milk sample are transported to the means for analysing a plurality of compounds or parameters in a milk sample via a tube element, via a conveyer element or by hand.

33. *(Previously Presented)* A system according to claim 31 where the means for analysing a plurality of compounds or parameters in a milk sample is spatially separated from the plurality of means for collecting a milk sample.

34. *(Original)* A system according to claim 32 where each individual milk sample is collected in an enclosure element.

35. *(Original)* A system according to any of claims 1-3, 6 or 15 where means for analysing a plurality of compounds or parameters is placed at each milking site.

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36. *(Original)* A system according to claim 1 where the data storage means comprises a database containing for each individual herd member multiple data related to previous analyses of milk samples from herd members for the presence of individual compounds or parameters.

37. *(Previously Presented)* A system according to claim 36 where the multiple data include data selected from the group consisting of data for identifying the milking site, milk yield data, data to identify the individual herd members, data related to parity, reproduction state and lactation state of the herd members including data indicating points in time in the reproduction and lactation cycles, data for time of sample collections, historical analytical data for the physiological and nutritional state, historical data for compositions of milk samples, feeding scheme data, or disease record data including data for previous disease treatments.

38. *(Previously Presented)* A system according to claim 36 where the data storage means is, or is operationally linked to, a data management system that is capable of comparing real time analytical data received from the signal detection means with data stored in the data storage means and, based thereupon, generating and transmitting an instruction message to a herd manager.

39. *(Previously Presented)* A system according to claim 1 or 38 where the data storage means is operably linked to a database comprising historical data descriptive of the

physiological and nutritional condition collected from members of one or more different milk producing animal herds, said database either being part of the system for optimising the production performance of a milk producing animal herd or being an external database operationally linked to the system for optimising the production performance of a milk producing animal herd.

40. *(Previously Presented)* A system according to claim 39 where the external database is operationally linked to the system for optimising the production performance of a milk producing animal herd via the internet.

41. *(Original)* A system according to claim 38 where the instruction message indicates that a specific herd member is ready for insemination.

42. *(Original)* A system according to claim 38 where the instruction message indicates that a specific herd member is in need of mastitis treatment.

43. *(Original)* A system according to claim 38 where the instruction message indicates that at least one specific herd member is in need of a feeding scheme adjustment.

44. *(Previously Presented)* A system according to claim 38 where the recipient of the instruction message is a pre-selected specialist.

45. *(Previously Presented)* A system according to claim 1 where the separate means for analyzing individual compounds or parameters comprises means for performing an analysis selected from the group consisting of an enzymatically based assay, an immunologically based assay, a biosensor analysis, a biochemical assay, a spectrometric assay and a flow injection based assay.

46. *(Previously Presented)* A system according to claim 45 where the separate means for analyzing individual compounds or parameters comprises solid support analytical devices.



47. *(Original)* A system according to claim 46 where the analysing means comprises or is operationally linked to means for storing and transporting the solid support analytical devices.

48. *(Previously Presented)* A method for optimising the production performance of a milk producing animal herd using the system according to any of claims 1-3, 6, 15, 36 or 41, the method comprising the steps of:

(i) collecting at a milking site a milk sample from each individual member of the herd,

(ii) contacting said sample with the analysing means that, in the presence of at least one compound or parameter indicative of the physiological condition, the nutritional condition or a combination of the physiological and nutritional conditions of the herd member, generates at least one detectable signal,

(iii) recording in the signal detection means the character of said at least one signal to provide a set of analytical data indicative of the presence, the amount or a combination of the presence and the amount of said compound or parameter,

(iv) having the generated data processed to provide a set of data descriptive of the physiological condition, the nutritional condition or a combination of the physiological and nutritional conditions of the individual herd member, and

(v) taking, on the basis of the set of data provided, appropriate steps to improve or correct the physiological condition, the nutritional condition or a combination of the physiological and nutritional conditions of any of the herd members in need of such improvement or correction.

49. *(Currently amended)* A method for optimising the production performance of a milk producing animal herd comprising a plurality of individual herd members using an automated or semi-automated system for optimising the production performance of a milk producing animal herd, the system comprising the following interconnected means:

(a) means for collecting a milk sample from an individual member of said herd, said means is connectable to a herd milking system,

(b) means for recognising a unique identification code assigned to each of the individual herd members ~~member~~,

(c) means for storing data including data for the physiological state, a nutritional state or a combination of physiological and nutritional state of said each individual herd member including data indicating point in time in the reproduction and lactation cycles,

(d) means for analysing a plurality of compounds or parameters in a milk sample being collected, said plurality of compounds or parameters ~~at least~~ including at least two of the following: a compound or parameter indicative of mastitis, a compound indicative of the reproduction cycle state, at least one compound indicative of the protein balance of the herd member ~~and~~ or at least one compound indicative of the energy balance state of the herd member, said analysing means comprising

(i) separate means for analysing individual compounds or parameters in the milk sample, each of said separate means for analysing individual compounds or parameters is capable of generating a detectable signal in the presence of an individual milk compound or parameter, and

(ii) means for detecting signals generated in the presence of a compound or parameter being analysed,

(e) means for converting the detected signals to a set of data that is indicative of the physiological condition, the nutritional condition or a combination of the physiological and nutritional conditions of said individual herd member,

(f) means for storage of said set of data descriptive of the physiological condition, the nutritional condition or a combination of the physiological and nutritional conditions for said individual herd members, and

(g) a means for producing data output,  
the method comprising the steps of:

- (i) collecting at a milking site a milk sample from each individual member of the herd,
- (ii) contacting said sample with the analysing means that, in the presence of at least one compound or parameter indicative of the physiological condition, the nutritional condition or a combination of the physiological and nutritional conditions of the herd member, generates at least one detectable signal,
- (iii) recording in the signal detection means the character of said at least one detectable signal to provide a set of analytical data indicative of the presence, the amount, or a combination of the presence and the amount of said compound or parameter,
- (iv) having the generated data processed to provide a set of data descriptive of the physiological condition, the nutritional condition or a combination of the physiological and nutritional conditions of the individual herd member, and
- (v) taking, on the basis of the set of data provided, appropriate steps to improve or correct the physiological condition, the nutritional condition or a combination of the physiological and nutritional conditions of any of the herd members in need of such improvement or correction.

50. *(Original)* A method according to claim 49 using a system where the sample collecting means is adapted to collect a milk sample from an individual mammary gland of a herd member.

51. *(Original)* A method according to claim 49 using a system where the sample collecting means is adapted to collect a sample combining milk from at least two mammary glands of a herd member.

52. *(Previously Presented)* A method according to claim 50 or 51 using a system where the sample collecting means is capable of collecting a proportional milk sample which is representative of average composition of total milk produced during the milking of each individual herd member.

53. *(Original)* A method according to claims 50 or 51 using a system where the sample collecting means is capable of collecting a subsample during a pre-selected time interval of the milking operation.

54. *(Original)* A method according to claim 49 using a system where the sample collecting means comprises means for storing a milk sample being collected.

55. *(Previously Presented)* A method according to claim 54 using a system where the means for storing a milk sample comprises mixing means for mixing the milk sample.

56. *(Previously Presented)* A method according to claims 49 or 54 using a system where the sample collecting means further comprises, or is operationally connected with, at least one of (i) means permitting the sample collecting means to be cleaned between samples, (ii) means for storing a buffer solution or a dilute solution, (iii) means for connecting the means for storing a milk sample to the means for analysing a plurality of compounds or parameters, the means for storing a buffer solution or the dilute solution, the herd milking system, a sample discharge outlet or a combination of the herd milking system and a sample discharge outlet, (iv) means for controlling the temperature of the milk sample being collected and (v) means for transporting the milk sample being collected.

57. *(Original)* A method according to claims 49 or 54 using a system where the sample collecting means comprises means for storing a plurality of milk samples.

58. *(Original)* A method according to claim 57 using a system where the means for storing a plurality of milk samples is in the form of a device comprising a plurality of milk storage containers.

59. *(Previously Presented)* A method according to claim 58 using a system where the device comprising a plurality of milk storage containers is inserted into the milk collecting means prior to collecting milk samples and is removed therefrom when the

plurality of samples is collected for bringing it into operational contact with the means for analysing a plurality of compounds or parameters.

60. *(Previously Presented)* A method according to claims 54 or 55 using a system where the means for storing a milk sample has a pressure that is different from the pressure of the herd milking system to which said means for storing a milk sample is connected.

61. *(Previously Presented)* A method according to any of claims 49 or 54 using a system where the means for collecting a milk sample is connected to an element of the herd milking system selected from the group consisting of a teat cup, a teat tube, a milk flow metering device, and a milk transporting tube.

62. *(Previously Presented)* A system according to claim 61 where the means for collecting a milk sample is connected to a tubing element of the herd milking system and is provided with a separate milk flow meter.

63. *(Original)* A method according to claim 49 where the compound indicative of mastitis is an enzyme, the amount of which is increased in milk from an inflamed mammary gland.

64. *(Original)* A method according to claim 63 where the enzyme is selected from the group consisting of lactate dehydrogenase (LDH) and beta-N-acetylglucosaminidase (NAGase) E.C. 3.2.1.52.

65. *(Previously Presented)* A method according to claim 64 using a system where the analysing means for analysing NAGase is capable of detecting an amount of NAGase which is in the range of 0 to 0.1 U/ml, an amount of LDH which is in the range of 100 to 2000 U/ml or a combination of NAGase in the range of 0 to 0.1 U/ml and LDH in the range of 100 to 2000 U/ml.

66. *(Currently Amended)* A method according to claim 49 using a system comprising separate analysing means for analysing a compound or parameter, the presence or

amount of which in milk is indicative of the reproduction cycle state of the milking animal, that is selected from the group consisting of a compound that indicates pro-oestrus, a compound that is indicative of oestrus (heat), a compound that indicates di-oestrus and a compound that indicates pregnancy.

67. *(Original)* A method according to claim 66 where the compound indicative of the reproduction cycle state of the milking animal is a hormone.

68. *(Original)* A method according to claim 67 where the hormone to be analysed is progesterone.

69. *(Previously Presented)* A method according to claim 68 using a system comprising analysing means for analysing progesterone that is capable of detecting an amount thereof in the milk sample which is in the range of 0 to 30 ng/ml.

70. *(Original)* A method according to claim 49 using a system where the compound or parameter that is indicative of the protein balance of the milking animal is selected from the group consisting of milk urea nitrogen (MUN) and total milk protein.

71. *(Previously Presented)* A method according to claim 70 using a system where the analysing means for analysing a compound or parameter that is indicative of the protein balance of the milking animal is capable of detecting an amount of MUN which is in the range of 0 to 1000 mg/l.

72. *(Original)* A method according to claim 49 where the compound or parameter that is indicative of the overall energy balance of the milking animal is selected from the group consisting of a ketone body compound and total milk fat content.

73. *(Original)* A method according to claim 72 where the ketone body compound is selected from the group consisting of acetolactate, beta-hydroxybutyrate (BOHB) and acetone.

74. *(Previously Presented)* A method according to claim 73 using a system where the analysing means for analysing a compound or parameter that is indicative of the overall energy balance of the milking animal is capable of detecting an amount of BOHB which is in the range of 0 to 0.7 mM.

75. *(Original)* A method according to any of claims 49, 54 or 63 using a system where the means for analysing a plurality of compounds or parameters in a milk sample is analytically linked to a plurality of means for collecting a milk sample.

76. *(Original)* A method according to claim 75 where milk samples collected by the plurality of means for collecting a milk sample is transported to the means for analysing a plurality of compounds or parameters in a milk sample via a tube element, via a conveyer element or by hand.

77. *(Previously Presented)* A method according to claim 75 where each individual milk sample is collected in an enclosure element.

78. *(Previously Presented)* A method according to claim 75 where the means for analysing a plurality of compounds or parameters in a milk sample is spatially separated from the plurality of means for collecting a milk sample.

79. *(Previously Presented)* A method according to claim 49 using a system where the data storage means comprises a database including for each individual herd member multiple data related to previous analyses of milk samples from herd members for the presence of individual compounds or parameters.

80. *(Previously Presented)* A method according to claim 79 where the multiple data include data selected from the group consisting of data for identifying the milking site, milk yield data, data to identify the individual herd members, data related to parity, reproduction state and lactation state of the herd members, data for time of sample collections, historical analytical data for the physiological and nutritional state, historical data for compositions of milk samples, feeding scheme data, and disease record data.

81. *(Previously Presented)* A method according to claim 79 where the data storage means is, or is operationally linked to, a data management system that is capable of comparing real time analytical data received from the signal detection means with data stored in the data storage means and, based thereupon, generating and transmitting an instruction message to a herd manager.

82. *(Previously Presented)* A method according to claim 49 or 81 using a system where the data storage means is operationally linked to a database comprising historical data descriptive of the physiological and nutritional condition collected from members of one or more different milk producing animal herds, said database either being part of the system or being an external database operationally linked to the system.

83. *(Previously Presented)* A method according to claim 82 where the external database is operationally linked to the system via the internet.

84. *(Original)* A method according to claim 81 where the instruction message indicates that a specific herd member is ready for insemination or becomes pregnant.

85. *(Original)* A method according to claim 81 where the instruction message indicates that a specific herd member is in need of mastitis treatment.

86. *(Original)* A method according to claim 81 where the instruction message indicates that at least one herd member is in need of a feeding scheme adjustment.

87. *(Previously Presented)* A method according to claim 81 where the recipient of the instruction message is a pre-selected specialist.

88. *(Previously Presented)* A method according to claim 49 using a system where the separate means for analysing individual compounds or parameters comprises means for performing an analysis selected from the group consisting of an enzymatically based assay, an immunologically based assay, a biosensor analysis, a biochemical assay, a spectrometric assay and a flow injection based assay.



89. *(Previously Presented)* A method according to claim 88 where the separate means for analysing individual compounds or parameters comprises solid support analytical devices.

90. *(Previously Presented)* A method according to claim 89 where the separate means for analysing individual compounds or parameters comprises or is operably linked to means for storing and transporting the solid support analytical devices.

91. *(Currently Amended)* An apparatus for analysing a plurality of compounds or parameters in a milk sample of an individual member of a milk producing animal herd, said apparatus comprising:

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(i) separate means for analysing individual compounds or parameters in the milk sample, each of said separate means being capable of generating a detectable signal in the presence of an individual sample compound or parameter,

(ii) means for directing a part of the milk sample to each separate analysing means, said directing means being controlled in response to at least one change for at least one parameter in at least one individual herd member recorded by said means for storing data for the physiological state, the nutritional state or a combination of the physiological state and nutritional state of each individual herd member relative to the data in said means for storing data for said individual herd member, such that the directing means is only activated at pre-selected points in time or at pre-selected time intervals in the reproduction ~~production~~ or lactation cycles, of the individual herd member or said directing means being controlled in response to a signal from said means for storing data such that the directing means is only activated at pre-selected points in time or at pre-selected time intervals in the reproduction or lactation cycles of the individual herd member.

92. *(Previously Presented)* An apparatus according to claim 91 further comprising means for detecting signals generated in the presence of a compound or parameter being analysed.

93. *(Previously Presented)* An apparatus according to claim 91 or 92 provided with means for connecting the apparatus with at least one of:

(a) means for collecting a milk sample from an individual member of said herd, said means is connectable to a herd milking system,

(b) means for recognising an identification code of the individual herd member,

(c) means for storing data,

(d) means for converting the detected signals to a set of data that is indicative of the physiological condition, the nutritional condition or a combination of the physiological and nutritional conditions of said individual herd member,

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(e) means for storage of said set of data descriptive of the physiological condition, the nutritional condition or a combination of the physiological and nutritional conditions for said individual herd members, and

(f) data output means for producing data output.

94. *(Previously Presented)* A system according to claim 14 where the means for collecting a milk sample is provided with a separate milk metering device.

95. *(Previously Presented)* A system according to claim 22, where the separate analyzing means for analysing progesterone is capable of detecting an amount thereof in the milk sample which is in the range of 0 to 20 ng/ml.

96. *(Previously Presented)* A system according to claim 25 where the separate analysing means for analysing a compound or parameter that is indicative of the protein balance of the milking animal is capable of detecting an amount of MUN which is in the range of 0 to 700 mg/l.

97. *(Cancelled)*

99. *(Previously Presented)* A method according to claim 73 using a system where the analysing means for analysing a compound or parameter that is indicative of the overall energy balance of the milking animal is capable of detecting an amount of BOHB which is in the range of 0.1 to 0.7 mM.

100. *(Previously Presented)* A method according to claim 80 where the reproduction state and lactation state of the herd members includes data indicating points in time in the reproduction and lactation cycles.

101. *(Previously Presented)* A method according to claim 80 where the disease record data includes data for previous disease treatments.

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102. *(Previously Presented)* An apparatus according to claim 91, where the directing means is controlled by a data indicating point in time on the reproduction and lactation cycles of said herd member.

103. *(Currently Amended)* A system ~~method~~ according to claim 44, wherein the pre-selected specialist is a farmer, a veterinarian, an inseminator, or a farm management consultant.

104. *(Previously Presented)* A method according to claim 87, wherein the pre-selected specialist is a farmer, a veterinarian, or a farm management consultant.

105. *(Previously Presented)* An apparatus according to claim 93, wherein said means for storing data is a means for storing data on the physiological and nutritional state of said each individual herd member.

106. *(Previously Presented)* An apparatus according to claim 93, wherein said means for storing data is a means for indicating point in time in the reproduction and lactation cycles.

107. *(Previously Presented)* A system according to claim 1 wherein the directing means is activated for at least one member of the animal herd in response to a detection of a change in at least one compound or parameter of the member of the animal herd, indicating an abnormality in the physiological or nutritional state of the member of the animal herd.

108. *(Previously Presented)* A system according to claim 107 wherein the pre-selected points in time or pre-selected time intervals are scheduled subsequently to the detection.

109. *(Currently Amended)* An apparatus ~~a system~~ according to claim 91 wherein the directing means is activated for at least one member of the animal herd in response to a detection of a change in at least one compound or parameter of the member of the animal herd, indicating an abnormality in the physiological or nutritional state of the member of the animal herd.

110. *(Currently Amended)* An apparatus ~~a system~~ according to claim 109 wherein the pre-selected points in time or pre-selected time intervals are scheduled subsequently to the detection.

111. *(Previously Presented)* A system according to claim 1, wherein said data for a physiological and nutritional state of said individual herd member is data indicating point in time in the reproduction and lactation cycles.

112. *(New)* A method for optimising the production performance of a milk producing animal herd comprising a plurality of individual herd members using an automated or semi-automated system for optimising the production performance of a milk producing animal herd, the system comprising the following interconnected means:

(a) means for collecting a milk sample from an individual member of said herd, said means is connectable to a herd milking system,

(b) means for recognising a unique identification code assigned to each of the individual herd members,

(c) means for storing data including data for the physiological state, a nutritional state or a combination of physiological and nutritional state of said each individual herd member including data indicating point in time in the reproduction and lactation cycles,

(d) means for analysing a plurality of compounds or parameters in a milk sample being collected, said plurality of compounds or parameters including at least one of a compound or parameter indicative of mastitis, a compound indicative of the reproduction cycle state, at least one compound indicative of the protein balance of the herd member or at least one compound indicative of the energy balance state of the herd member, said analysing means comprising

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(i) separate means for analysing individual compounds or parameters in the milk sample, each of said separate means for analysing individual compounds or parameters is capable of generating a detectable signal in the presence of an individual milk compound or parameter, and

(ii) means for detecting signals generated in the presence of a compound or parameter being analysed,

(e) means for converting the detected signals to a set of data that is indicative of the physiological condition, the nutritional condition or a combination of the physiological and nutritional conditions of said individual herd member,

(f) means for storage of said set of data descriptive of the physiological condition, the nutritional condition or a combination of the physiological and nutritional conditions for said individual herd members, and

(g) a means for producing data output, the method comprising the steps of:

(i) collecting at a milking site a milk sample from each individual member of the herd,

(ii) contacting a part of said sample with the analysing means that, in the presence of at least one compound or parameter indicative of the physiological condition, the nutritional condition or a combination of the physiological and nutritional conditions of the herd member, generates at least one detectable signal,

(iii) recording in the signal detection means the character of said at least one detectable signal to provide a set of analytical data indicative of the presence, the amount, or a combination of the presence and the amount of said compound or parameter,

(iv) having the generated data processed to provide a set of data descriptive of the physiological condition, the nutritional condition or a combination of the physiological and nutritional conditions of the individual herd member, and

(v) taking, on the basis of the set of data provided, appropriate steps to improve or correct the physiological condition, the nutritional condition or a combination of the physiological and nutritional conditions of any of the herd members in need of such improvement or correction.

113. (New) A method for optimising the production performance of a milk producing animal herd comprising a plurality of individual herd members using an automated or semi-automated system for optimising the production performance of a milk producing animal herd, the system comprising the following interconnected means:

(a) means for collecting a milk sample from an individual member of said herd, said means is connectable to a herd milking system,

(b) means for recognising a unique identification code assigned to each of the individual herd members,

(c) means for storing data including data for the physiological state, a nutritional state or a combination of physiological and nutritional state of said each individual herd member including data indicating point in time in the reproduction and lactation cycles,

(d) means for analysing a plurality of compounds or parameters in a milk sample being collected, said plurality of compounds or parameters including at least one of a compound or parameter indicative of mastitis, a compound indicative of the reproduction cycle state, at least one compound indicative of the protein balance of the herd member or at least one compound indicative of the energy balance state of the herd member, said analysing means comprising

(i) separate means for analysing individual compounds or parameters in the milk sample, each of said separate means for analysing individual compounds or parameters is capable of generating a detectable signal in the presence of an individual milk compound or parameter, and

(ii) means for detecting signals generated in the presence of a compound or parameter being analysed,

C/A  
Cont.  
(e) means for converting the detected signals to a set of data that is indicative of the physiological condition, the nutritional condition or a combination of the physiological and nutritional conditions of said individual herd member,

(f) means for storage of said set of data descriptive of the physiological condition, the nutritional condition or a combination of the physiological and nutritional conditions for said individual herd members, and

(g) a means for producing data output, the method comprising the steps of:

(i) collecting at a milking site a milk sample from each individual member of the herd,

(ii) contacting a part of said sample with the analysing means that, in the presence of at least one compound or parameter indicative of the physiological condition, the nutritional condition or a combination of the physiological and nutritional conditions of the herd member, generates at least one detectable signal,

(iii) recording in the signal detection means the character of said at least one detectable signal to provide a set of analytical data indicative of the presence, the amount, or a combination of the presence and the amount of said compound or parameter, said character indicating a change in the presence, the amount or a combination of the presence and the amount of said compound or parameter for at least one member of the herd, relative to the date in said means for storing data, for said herd member,

(iv) having the generated data processed to provide a set of data descriptive of the physiological condition, the nutritional condition or a combination of the physiological and nutritional conditions of the individual herd member,

C/Cont.  
(v) changing the frequency or the timing of the contacting of a part of a milk sample with analysing means until the physiological condition, the nutritional condition or a combination of the physiological and nutritional conditions of said herd member is improved or corrected, and

(vi) taking, on the basis of the set of data provided, appropriate steps to improve or correct the physiological condition, the nutritional condition or a combination of the physiological and nutritional conditions of any of the herd members in need of such improvement or correction.

114. (New) A method for optimising the production performance of a milk producing animal herd comprising a plurality of individual herd members using an automated or semi-automated system for optimising the production performance of a milk producing animal herd, the system comprising the following interconnected means:

(a) means for collecting a milk sample from an individual member of said herd, said means is connectable to a herd milking system,

(b) means for recognising a unique identification code assigned to each of the individual herd members,



(c) means for storing data including data for the physiological state, a nutritional state or a combination of physiological and nutritional state of said each individual herd member including data indicating point in time in the reproduction and lactation cycles,

(d) means for analysing a plurality of compounds or parameters in a milk sample being collected, said plurality of compounds or parameters including at least two of the following: a compound or parameter indicative of mastitis, a compound indicative of the reproduction cycle state, at least one compound indicative of the protein balance of the herd member or at least one compound indicative of the energy balance state of the herd member, said analysing means comprising

C1  
Concluded.  
(i) separate means for analysing individual compounds or parameters in the milk sample, each of said separate means for analysing individual compounds or parameters is capable of generating a detectable signal in the presence of an individual milk compound or parameter, and

(ii) means for detecting signals generated in the presence of a compound or parameter being analysed,

(e) means for converting the detected signals to a set of data that is indicative of the physiological condition, the nutritional condition or a combination of the physiological and nutritional conditions of said individual herd member,

(f) means for storage of said set of data descriptive of the physiological condition, the nutritional condition or a combination of the physiological and nutritional conditions for said individual herd members, and